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SURVEY OF SUPERMARKET CONTAINER REDEMPTION OPERATIONS

Conducted by
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for
Food Marketing Institute

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The Food Marketing Institute (FMI) is a non-profit association that conducts programs in research, education and public affairs on behalf of its 1,500 members—food retailers and wholesalers and their customers in the United States and overseas. FMI's domestic member companies operate more than 17,000 retail food stores with a combined annual sales volume of $150 billion—half of all grocery sales in the United States. More than three-fourths of the FMI's membership is composed of independent supermarket operators or small regional firms. Its international membership includes more than 150 members from 40 nations.

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I EXECUTIVE SUMMARY

This report presents the findings of the FMI survey on supermarket container redemption operations. The survey covered stores in deposit areas and refillable only stores (stores that are outside deposit areas but handle a significant volume of refillable containers).

The report gives industry benchmark costs for different store redemption methods and container volumes. Costs for reverse vending redemption have not been developed, because the greatest portion of these costs reside in the agreements made with the equipment and beverage suppliers. Only quantifiable costs directly attributable to container return handling have been included in the engineered cost models. Intangible factors such as store distribution costs are not included. We therefore would expect that the costs developed through engineering analysis will be close to optimal costs for the described return operation.

It is important to note that these benchmarks have been developed on the basis of the most commonly observed redemption methods and by using an average of the figures from the responding companies for values such as average wage range, space costs, and distances traveled. A given company will operate with methods or a cost structure that may vary significantly from the assumptions followed in developing the cost models. Therefore, worksheets and a diskette have been included to assist a company in determining its container redemption costs based on its particular operating characteristics (including reverse vending).

The major results from the study are:

- Stores operating in deposit areas report an average redemption cost for all types of containers of $.028 per container, with a range from $.020 to $.049 for an average high volume and low volume store, respectively.
  - This compares to a composite cost of $.028 per unit (with a range from $.022 to $.036 per container for high and low volume stores) for all types of containers, as determined by industrial engineering analysis.
- Refillable only stores handling mainly loose refillable glass containers report costs of $.047 per container, with a range from $.032 to $.135 per container for average high volume and low volume stores.
  - This compares to an engineered cost of $.036 per loose glass container, with a range from $.033 to $.045 for average high volume and low volume stores.
  - The engineered cost for handling 16-ounce 8-pack glass containers for a median volume store has been estimated at $.023 per container.
- For all stores in the study, labor and space account for about 90 percent of handling costs.
- For a typical store operation in a deposit area, the engineered cost of handling refillables by type of container is:

	Weighted Cost per Container	Cost Range Based on Store Volume	
		Low	High
Aluminum cans	$.024	$.033	$.019
Bulk glass	.028	.038	.022
Nested glass	.032	.044	.025
Plastic	.030	.041	.024

- For all stores in the study, there is a sharp trend downward in handling cost per container—drops of 65 to 76 percent—as redemption volume increases. This is attributable to several factors:
  - Fixed redemption costs are spread over a larger volume and over a greater average return per customer.
  - The superior container handling equipment of higher volume stores in used more effectively.
  - Space in redemption facilities is used more effectively.
- The main reasons for the higher redemption costs found in stores outside mandatory deposit areas are:
  - Lower container volume
  - Less efficient redemption operations
  - Prevalence of glass containers, which require more labor in handling.
- Container handling methods and customer service vary widely.
  - Smaller volume stores tend to use checkout redemption; larger volume stores use dedicated or customer service redemption.
  - Most stores operate their redemption center for the same hours that the store is open.
  - Less than half the stores require customers to perform redemption tasks.

II INTRODUCTION

Since 1972, when Oregon and Vermont became the first states to adopt a mandatory deposit law for all beer and soft drink containers, seven other states and a number of municipalities have established mandatory deposit laws.

To comply with the deposit laws and to handle refillable containers, supermarkets have tested and implemented various methods for handling returns, seeking approaches that are both cost-effective and convenient to customers.

To evaluate the tangible and intangible effects of the major redemption methods currently being used by supermarkets,the Food Marketing Institute (FMI) commissioned Cresap, McCormick and Paget incorporating Case and Company (CMP) to survey its members to understand better the methods, perceived costs, and procedures.

In addition to the survey, the study team visited 30 supermarkets to analyze and develop representative engineered costs and to develop a cost worksheet to assist supermarkets in determining their own costs.

The specific objectives of the study were to:

- ❑ Report on the methods, costs, and procedures of the member companies operating under deposit laws or handling a substantial amount of refillable containers
- ❑ Perform industrial engineering studies to identify those factors critical to the costs of container handling, and to develop representative costs for the major redemption methods
- ❑ Develop worksheets and a computer-assisted program to enable member companies to determine their own costs and compare themselves to an industry benchmark.

It is important to note that only 17 percent of the questionnaire respondents had performed a formal cost study of their container handling operation. The lack of formal analysis was often reflected in the questionnaire responses. Responses that fell outside realistic ranges consequently were excluded from the results.

Using the cost worksheet format and the engineered time standards provided for selected elements of the operation (or using their own time standards), companies will be able to evaluate their particular costs and to investigate other redemption methods that may be more suitable and cost-effective for their operations. Such analysis should consider not only the total costs assignable to the container return operation, but also the incremental costs of different redemption methods and types of containers. Particular attention should be paid to the incremental cost of:

- ❑ ***Front-end checkout:*** How much redemption is actually being performed during cashier idle times?
- ❑ ***Back-room sorting:*** How much work could be performed during low work demand periods?
- ❑ ***Management:*** Is this truly an incremental cost?

III PROFILE OF PARTICIPANTS

In the fall of 1985, FMI members were sent a short questionnaire to identify those companies that operate in deposit areas and those that have a significant volume in refillable containers. A second questionnaire, more detailed and tailored to the responses received from the short questionnaire, was designed and mailed to collect data on methods, perceived costs, and procedures for handling refillable containers.

From the questionnaires received, we were able to use responses from 112 companies, operating 1,715 supermarkets in 21 states.

PROFILE OF COMPANIES IN DEPOSIT AREAS

Number of companies in deposit areas	46
Number of supermarkets in deposit areas	748
Average total number of supermarkets per company	38
Average number of supermarkets per company in deposit areas	16
Average weekly sales per supermarket	$167,898
Average number of deposit containers sold per week	27,200
Average number of deposit containers redeemed per week	30,200
Percent container redemption	111%

PROFILE OF COMPANIES OUTSIDE DEPOSIT AREAS

Number of companies outside deposit areas	66
Number of supermarkets	967
Average number of supermarkets per company	25
Average number of supermarkets per company handling refillables	14 *
Average weekly sales per supermarket	$161,200
Average number of refillable containers sold per week	7,568
Average number of refillable containers redeemed per week	5,456
Percent container redemption	72%

*In excess of 300 refillable containers per week.

The distribution of surveyed companies by the total number of supermarkets they operate is as follows:

Total Number of Supermarkets	Percent of Companies
1	19%
2-50	52
51-100	20
100 +	9

The distribution of companies ranked by the number of supermarkets each company operates in deposit areas or with a substantial volume of refillables is shown below.

Number of Supermarkets	Percent of Companies
1	22%
2-50	50
51-100	16

IV DEFINITION OF MAJOR REDEMPTION COST COMPONENTS

This chapter defines the four major cost components of the redemption operation:

- Labor.
- Space.
- Investment.
- Operating.

The definitions used here were those provided to survey participants.

LABOR COSTS

Labor costs were calculated per container, using the reported labor and management costs per week and the estimated number of containers redeemed per week. Labor costs include:

- The cost of receiving and sorting containers.
- The cost of paying the customer.
- The cost of transporting containers from the redemption area to a secondary sorting operation, or to the back room.
- The costs of loading or supervising the outbound shipment of containers.
- The cost of management and clerical time.

SPACE COSTS

Space costs were calculated using the dedicated or partially allocated space for redemption activities, an average reported cost per square foot of $14.75 per year, and an average store container volume. Space costs include:

- Occupancy costs for the redemption area.
- Occupancy costs for all dedicated or partially allocated back room storage areas.

INVESTMENT COSTS

Investment costs were based on the reported capital investment costs and the annualized container volume. Included are:

- Building additions or modifications to existing facilities.
- One-time costs to purchase registers, computer systems, transporting equipment, or container holding devices.
- A 12 percent annual cost of capital.

OPERATING COSTS

Operating costs were calculated using reported annual recurring costs and container redemption volume. Operating costs include:

- Recurrent incremental costs directly attributable to the redemption operation, such as pest extermination, register maintenance, plastic bags, crates, or other carrying devices.
- Container inventory carrying costs (empty and full).

Deposit money float has not been included because of the complexity of the calculation and the small impact this cost component has on the overall economics of redemption operations.

V QUESTIONNAIRE FINDINGS

INTRODUCTION

This chapter summarizes the responses from companies that operate in deposit areas and companies that, although not subject to deposit laws, handle a significant amount of refillable containers. The next two chapters discuss responses from each category in more detail.

Unless otherwise noted, all cost comparisons are based on a median volume store, with a range of 16,000 to 38,000 containers per week for deposit stores and 5,000 to 10,000 containers per week for refillable only stores.

MAJOR CONCLUSIONS

1. Stores in deposit areas handle a much higher volume of containers than refillable only stores.
   - ❑ The average deposit area store handled 30,200 containers weekly; actual figures reported ranged from 2,300 to 69,000 containers per week.
   - ❑ The average refillable only stores handled approximately 7,300 containers weekly; actual numbers ranged from 300 to 16,800 containers a week.

2. Refillable only stores report a much higher handling cost per container than stores in deposit areas.
   - ❑ The average container handling cost for a median volume refillable only store is $.047, versus $.026 per container for stores in deposit areas.
   - ❑ The cost range between the highest and lowest cost refillable only stores was found to be much greater than the range for stores in deposit areas—$.103 versus $.029 per container.

3. High redemption volume stores show significantly lower handling costs per container than median or low volume stores.
   - ❑ In deposit areas, high volume stores report 59 percent lower handling costs than low volume stores.
   - ❑ High volume refillable only stores report 76 percent lower costs than low volume stores.

4. Labor and space costs account for about 90 percent of all container handling costs.
   - ❑ Labor accounted for about 71 percent and space accounted for 19 percent of total costs.
   - ❑ Labor costs for all stores constitute about the same percentage of the total costs (70 percent); space costs, however, were about double (20.7 percent versus 10.4 percent) for refillable only stores.

5. Stores in deposit areas report a higher investment in redemption facilities than refillable only stores.
   - ❑ Deposit area stores report an average investment of $.002 per container, versus less than $.001 for refillable only stores.

6. The difference in handling costs between deposit area stores and refillable only stores can be attributed to several factors.
   - ❑ Refillable only stores handle only glass, which is costlier to handle.
   - ❑ Stores in deposit areas use more efficient redemption facilities and methods, as befits their higher redemption volumes.
   - ❑ Regardless of volume, a fixed amount of space must be dedicated to container redemption; consequently, the higher volumes of deposit area stores allow them better space utilization on a per container basis.
   - ❑ Stores in deposit areas double-handle only 23 percent of containers, as compared to 54 percent for refillable only stores.
   - ❑ Economies of scale favor high volume stores, which are most often deposit area stores.

7. Stores in deposit areas use different primary redemption methods than refillable only stores.
   - ❑ Stores in deposit areas predominantly use customer service and dedicated redemption centers for redemption.
     - ■ Generally, only 16 percent of all containers are double sorted under this method, so it is very efficient for higher volume operations.
   - ❑ Refillable only stores use checkout redemption to a much greater extent.
     - ■ Generally, 64 percent of all containers are double sorted when using checkout redemption.

8. Smaller stores tend to use checkout redemption while large volume stores use customer service or dedicated redemption.
   - ❑ This finding is consistent for all stores in the study.

9. Highlights of customer service practices followed by the stores are:
   - ❑ 80 to 82 percent of the stores operate their redemption centers for the same hours that the store is open.
   - ❑ 33 to 45 percent of the stores require customers to take their containers out of the bag or box and place them on the counter.
   - ❑ 6 to 12 percent of the stores require the customer to sort glass by color, size, or brand.

VI STORES OPERATING IN DEPOSIT AREAS

This chapter describes the questionnaire findings for companies that operate supermarkets in deposit areas.

Stores in deposit areas have been categorized according to their container redemption volume, as follows:

	Average Containers Redeemed Per Week	Redemption Volume Range	Percent of All Stores
High Volume	47,000	38,000-69,000	10%
Median Volume	30,000	16,000-37,999	80
Low Volume	11,000	2,300-15,999	10

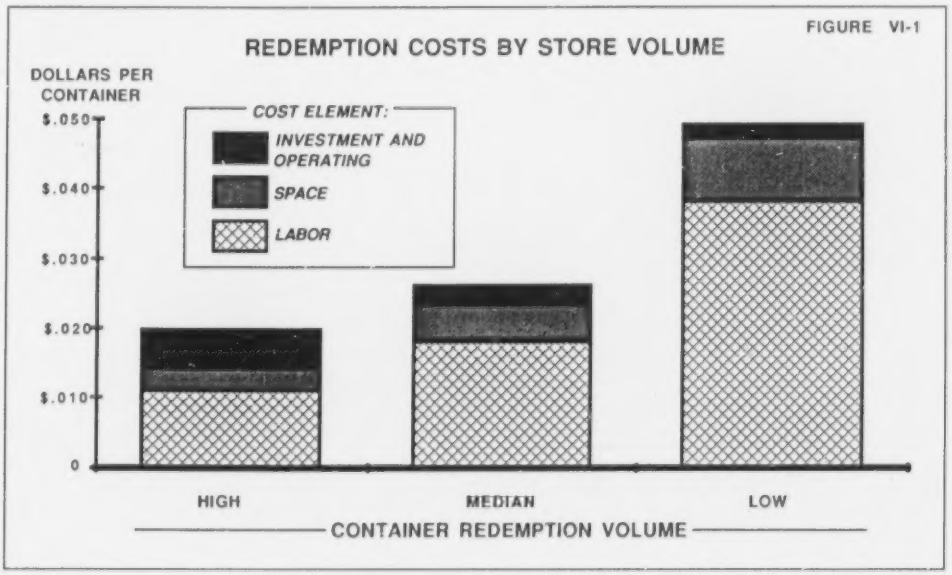
This chapter is divided into six sections:

- ❑ Summary.
- ❑ Labor Costs.
- ❑ Space Requirements.
- ❑ Investment and Operating Costs.
- ❑ Redemption Methods.
- ❑ Customer Services.

SUMMARY

Figure VI-1 shows the total reported handling cost for stores in deposit areas. The graph shows that median volume stores reported a total composite cost of $.026 per container to handle refillables. It also shows that as store redemption volume decreases, costs per container rise sharply, from $.020 per container for the high volume stores to $.049 per container for the low volume stores. The total weighted composite average for all stores is $.028.

FIGURE VI-1



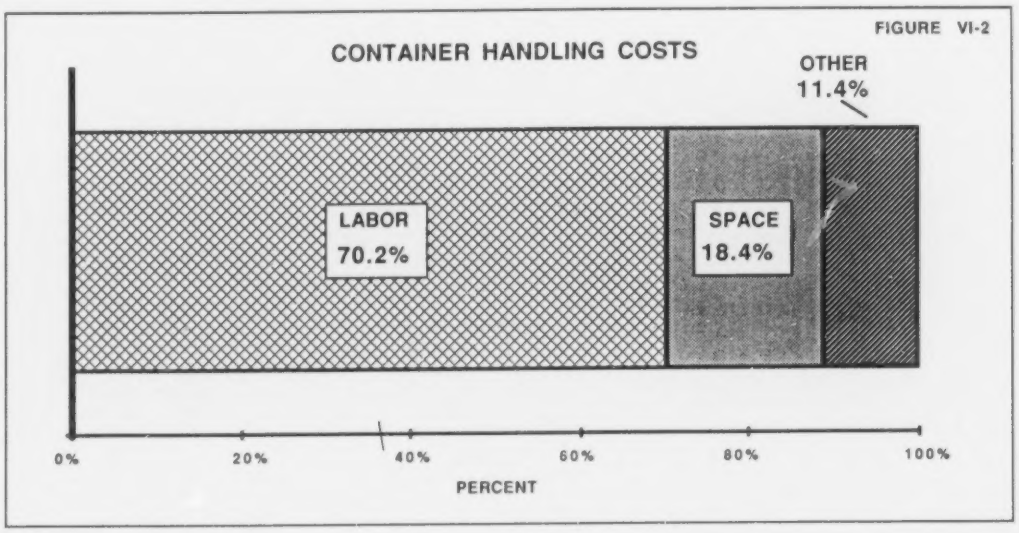
The cost profile for a representative store in each classification is:

	Container Redemption Volume High	Median	Low	Percent Difference, High-Low
Labor	$.011	$.018	$.038	245%
Space	.003	.005	.009	200
Investment	.002	.002	.001	(100)
Operating	.004	.001	.001	(67)
Total	$.020	$.026	$.049	145%

The comparison between high and low volume stores shows that labor and space costs more than double for the low volume stores, even though investment is actually lower for these stores. This suggests that the methods and facilities used in low volume stores, and not only volume, may account for the relative economics found.

Labor constitutes the largest single cost component of handling containers. It accounts for over 70 percent of the total redemption costs. The average cost breakdown is shown in Figure VI-2.

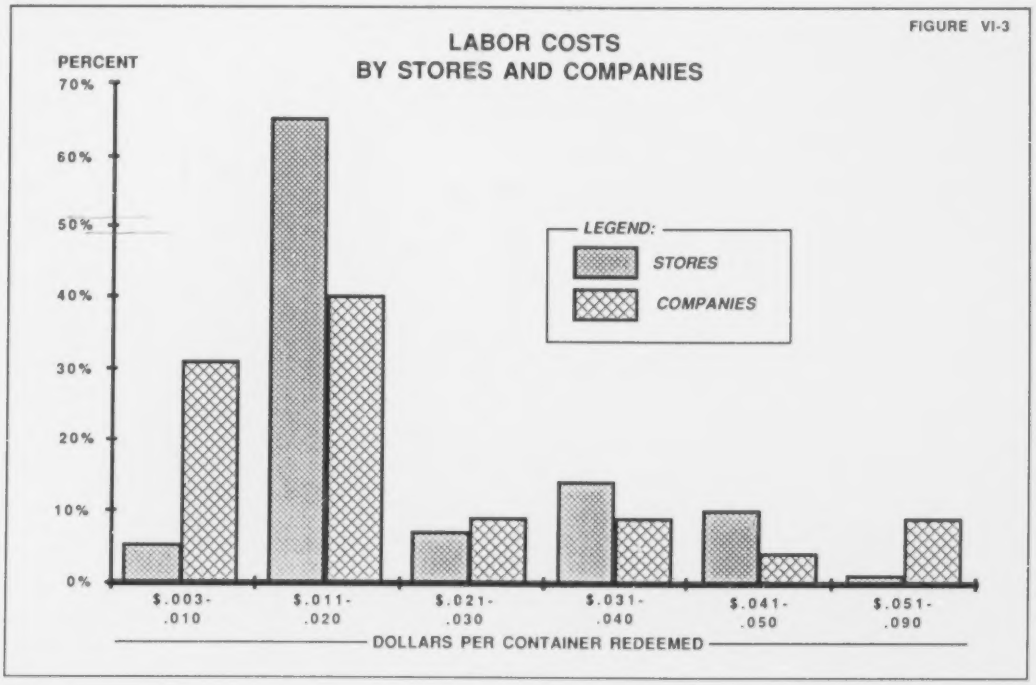
FIGURE VI-2



LABOR COSTS

Labor costs vary significantly among respondents; Figure VI-3 shows costs summarized by responding companies and by responding stores. As the chart indicates, 31 percent of the companies report labor costs at or under $.01 per container, but these companies constitute only 5 percent of the total stores. There is, however, a well defined sector of companies and stores reporting labor costs in the range of $.011 to $.020 per container.

FIGURE VI-3



Store volume has a definite effect on redemption labor costs. Figure VI-4 shows labor costs ranging from about $.011 to $.038 per container for high and low volume stores, respectively.

FIGURE VI-4

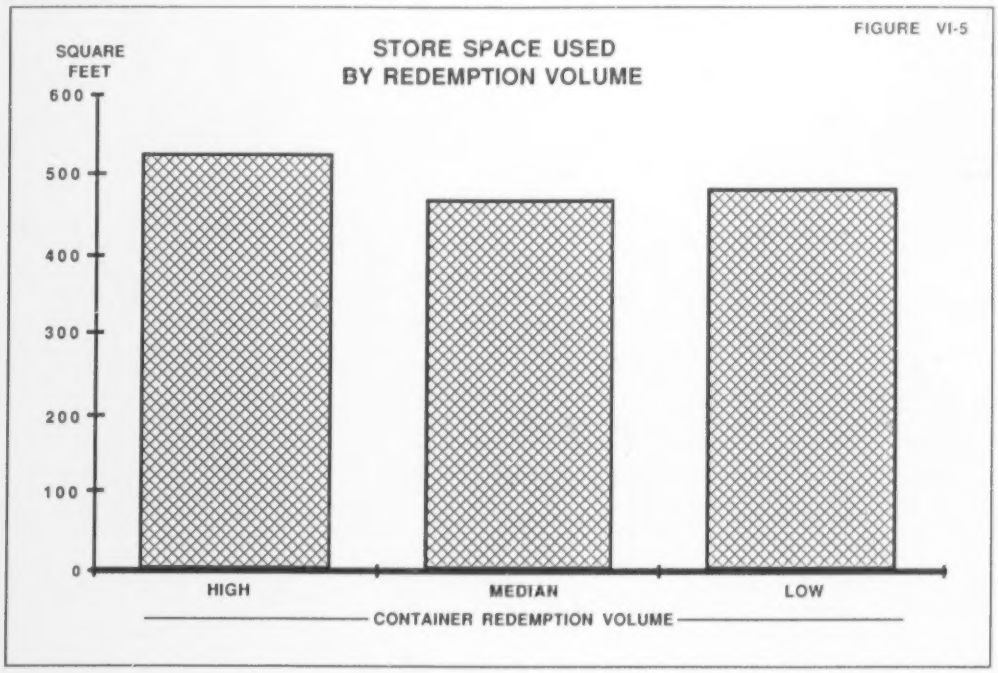
SPACE REQUIREMENTS

Figure VI-5 depicts the relationship between store container volume and space used for redemption. As shown, there is essentially no difference in the reported space used by low and high volume stores. During our visits to the stores, we noted various factors that may account for this unexpected result:

- ❑ A fixed amount of space will be required by sort type, regardless of volume.
- ❑ Distributors pick up containers more frequently for large volume stores; therefore, low volume stores maintain a relatively higher inventory.
- ❑ Space used for containers is often not managed to maximum efficiency.

The average reported annual occupancy cost is $14.75 per square foot, with actual figures ranging from $5.25 to $101.10 per square foot per year.

FIGURE VI-5



INVESTMENT AND OPERATING COSTS

Investment costs are those one-time costs incurred to set up redemption facilities. The majority of these costs are incurred in the purchase of cash registers, racks, shelving, and transporting devices.

Operating costs include those recurrent annual costs attributable to the redemption operation. Most of the reported operating costs are in special payment fees, additional pest extermination, register maintenance, plastic bags, and container carrying devices.

Reverse vending machines are most commonly used by high volume stores. Operating fees for these machines cause an appreciable increase in redemption operating costs. On the other hand, reverse vending significantly reduces redemption labor costs for the high volume stores.

The table below shows that large and median stores have invested significantly more in setting up the redemption systems than smaller stores. The table also shows that operating costs are about equal for all volume stores.

Investment and operating costs represent about 19 percent, 12 percent, and 4 percent, respectively, of the total container handling cost for the high, median, and low volume stores.

	Costs Per Container		
	High Volume	Median Volume	Low Volume
Investment Costs	$.002	$.002	$.001
Operating Costs	.003	.001	.001
Total	$.005	$.003	$.002

REDEMPTION METHODS

Four primary redemption methods are used by the respondents:

- Redemption at the checkout stations.
- Redemption at the customer service center.
- Redemption at a separate, dedicated redemption station.
- Reverse vending machines.

Figure VI-6 shows that approximately 78 percent of all stores use customer service or a separate redemption area as the primary mode of redemption, and about 81 percent of all containers were redeemed using these methods.

FIGURE VI-6

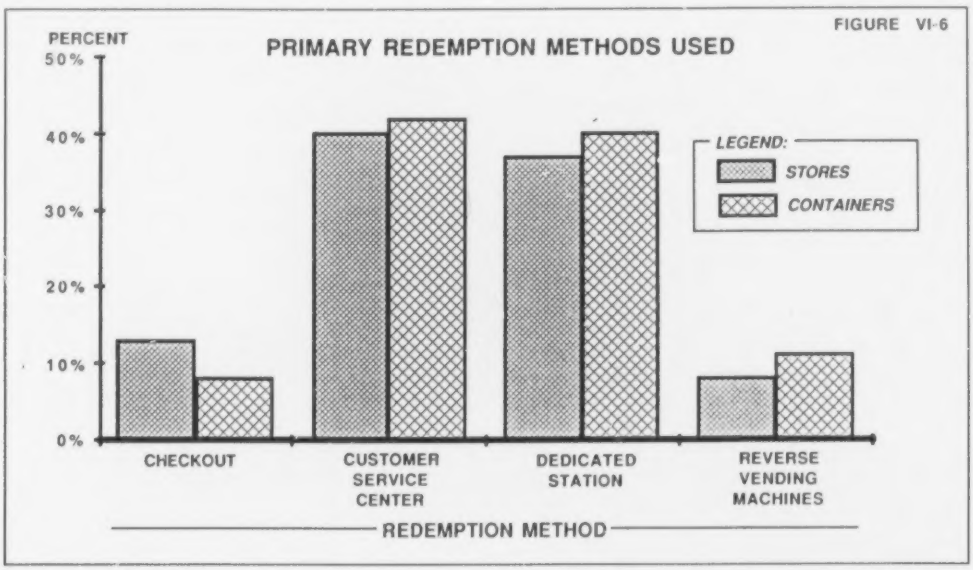
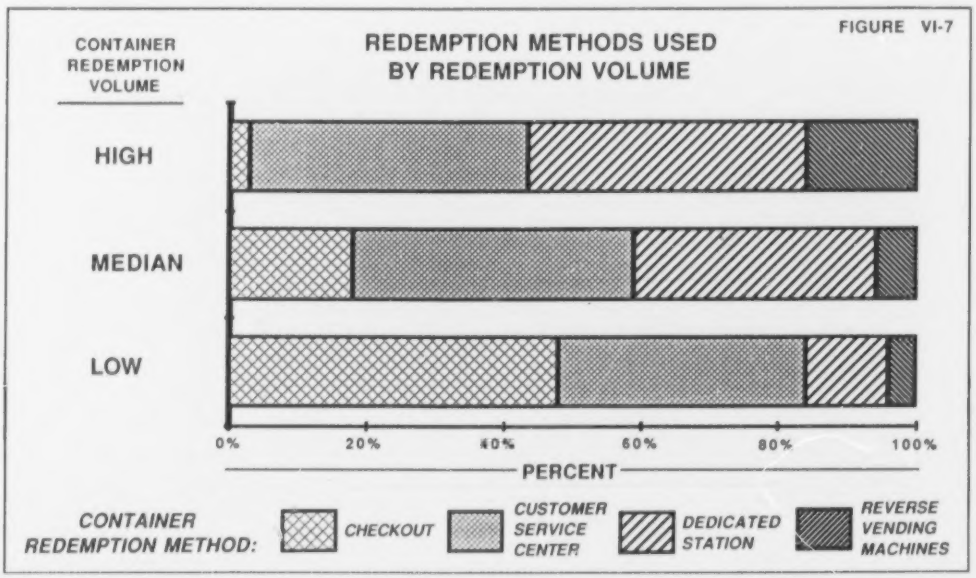


Figure VI-7 shows a clear relationship between redemption method and store volume. Stores with low redemption volume tend to use checkout redemption, while stores with high redemption volume use customer service or a separate center.

- About 48 percent of low volume stores tend to use checkout redemption, compared to 3 percent for the high volume stores.
- In contrast, about 81 percent of the high volume stores use either customer service or a dedicated center for redemption.

FIGURE VI-7



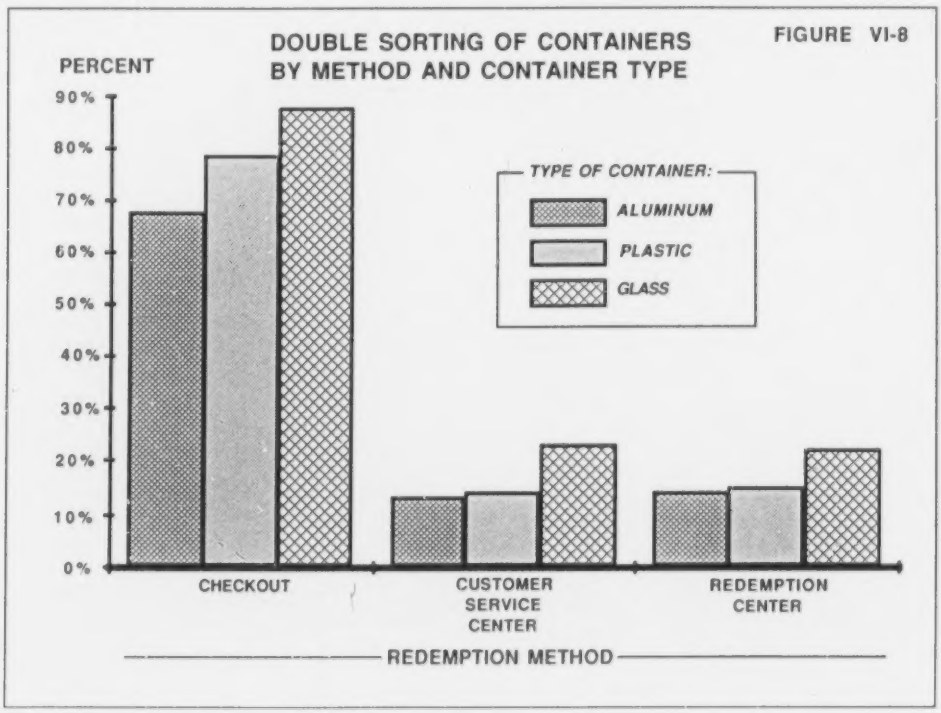
The table below illustrates the average percentage redeemed by type of container and the percentage of containers sorted twice, by specific type.

Type of Container	Percent of Total Redeemed	Percent Double-Sorted
Aluminum	40%	11%
Plastic	26	14
Glass	32	39
All Containers		21%

Figure VI-8 shows the frequency of double sorting, by redemption method.

- About 75 percent of all checkout containers are double sorted.
- This compares to about 18 percent of containers double sorted at customer service or at a redemption center.

FIGURE VI-8



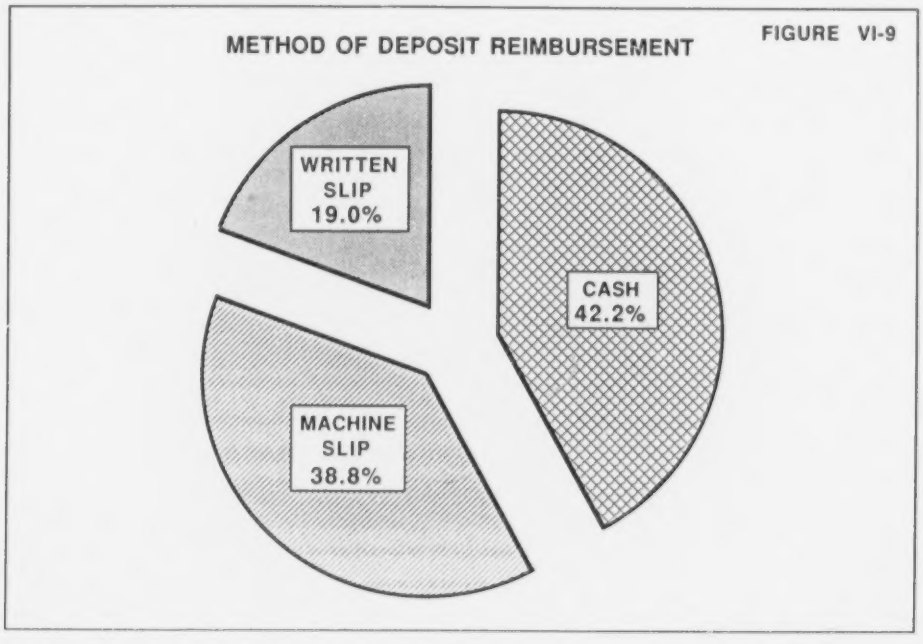
CUSTOMER SERVICE

Respondents indicated three primary modes of payment for redeemed containers:

- Cash payment at redemption.
- Machine slip countersigned by the redemption clerk.
- Written slip.

Figure VI-9 shows that about 42 percent of the stores responding use cash payment; about 39 percent use machine slips.

METHOD OF DEPOSIT REIMBURSEMENT FIGURE VI-9



Other redemption practice results are as follows:

Practice	Percent of Stores
Keep redemption areas open at all times the store is open	87%
Require customers to place containers on counter area	33
Require customers to organize the containers by material type or brand	17
Require customers to place containers in designated bins	8
Require customers to sort glass by color, size, or brand	6

VII REFILLABLE ONLY STORES

This chapter describes the questionnaire findings for companies that operate supermarkets outside of mandatory deposit law areas but that have a significant volume of refillable containers.

Refillable only stores have been categorized according to their redemption volume as follows:

	Average Number of Containers Redeemed Per Week	Redemption Volume Range	Percent of All Stores
High Volume	13,000	10,001-17,000	10%
Median Volume	7,300	5,001-10,000	80
Low Volume	1,900	300-5,000	10

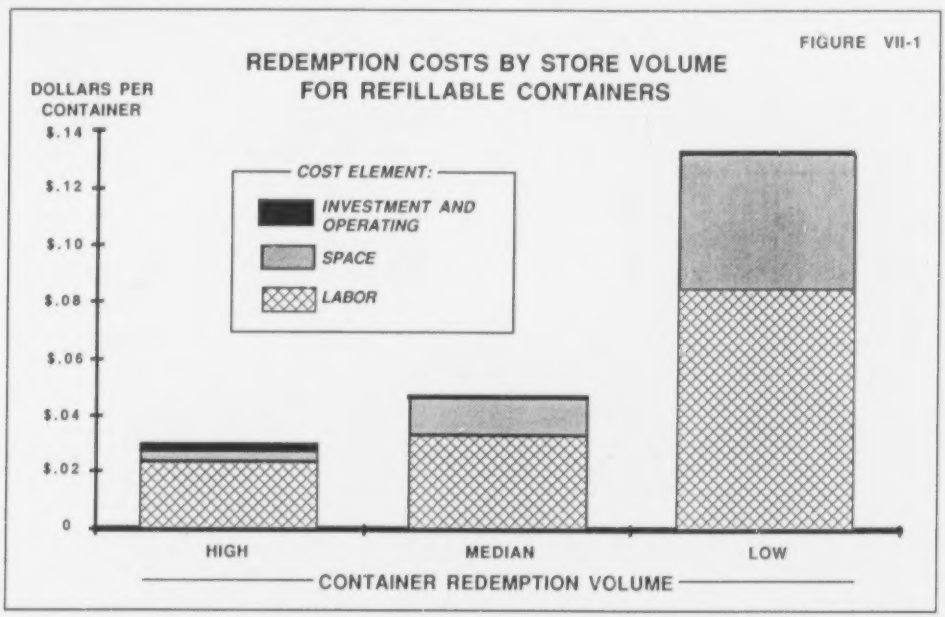
This chapter is divided into six sections:

- ❑ Summary.
- ❑ Labor Costs.
- ❑ Space Requirements.
- ❑ Investment and Operating Costs.
- ❑ Redemption Methods.
- ❑ Customer Service.

SUMMARY

Figure VII-1 shows the total handling cost for refillable containers. As with the stores in deposit areas, costs increase sharply as redemption volume decreases. Total cost per container ranges from $.032 per container for the high volume stores to $.135 per container for the low volume stores. The total weighted average for all stores is the same as the median, $.047.

FIGURE VII-1



The cost profile for a representative store for each classification is as follows:

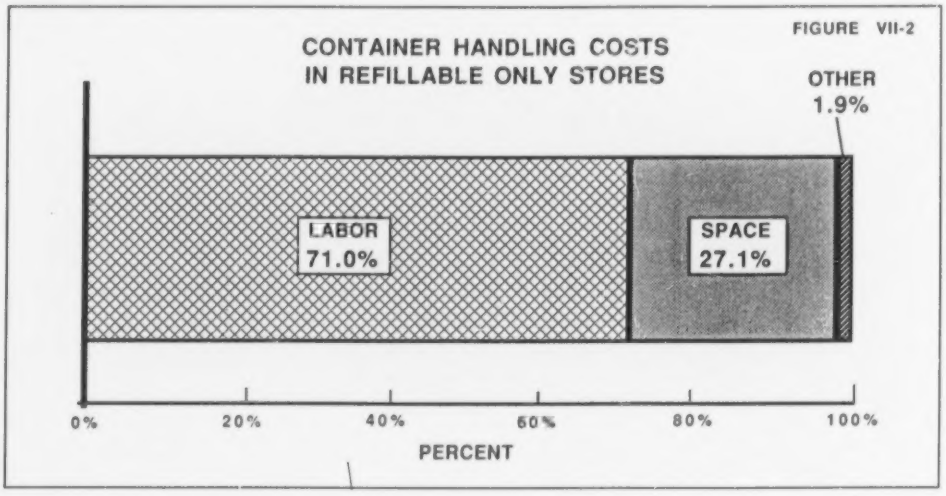
	Container Redemption Volume			Percent Difference, High-Low
	High	Median	Low	
Labor	$.024	$.033	$.085	245%
Space	.005	.013	.049	880
Investment	.002	(a)	(a)	—
Operating	.001	.001	.001	—
Total	$.032	$.047	$.135	322%

(a) Less than $.001.

As shown, labor and space costs per container increase dramatically as store redemption volume declines, but investment costs are lower for lower volume stores. This is the same pattern observed with the stores in deposit law areas.

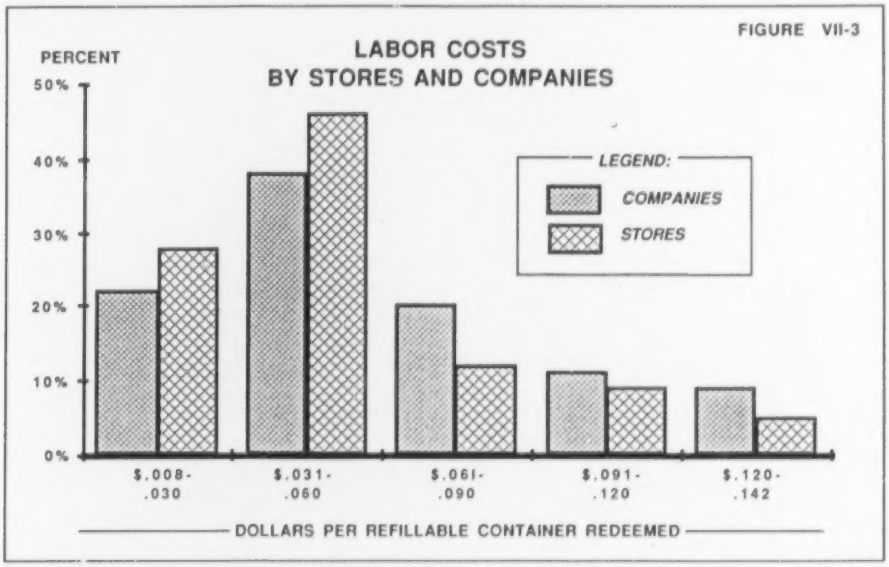
Labor is by far the largest cost for handling containers, accounting for about 71 percent of the total handling costs. Labor and space costs make up 98 percent of the total container handling costs. Figure VII-2 shows the cost components.

FIGURE VII-2

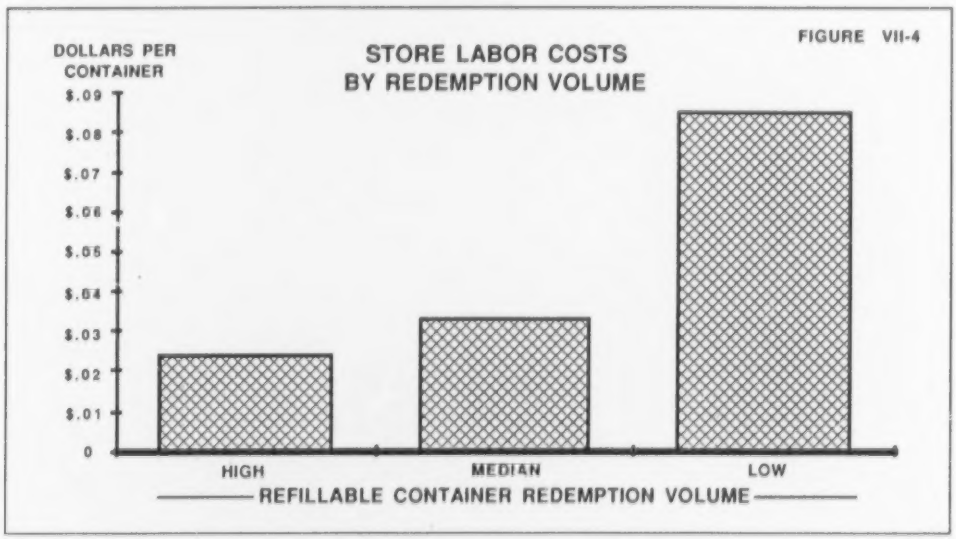


LABOR COSTS

Figure VII-3 shows the extreme labor cost variability among respondents, ranging from $.008 to $.1423 per container. However, about 38 percent of the companies (46 percent of the stores) report labor costs per container between $.03 and $.06.

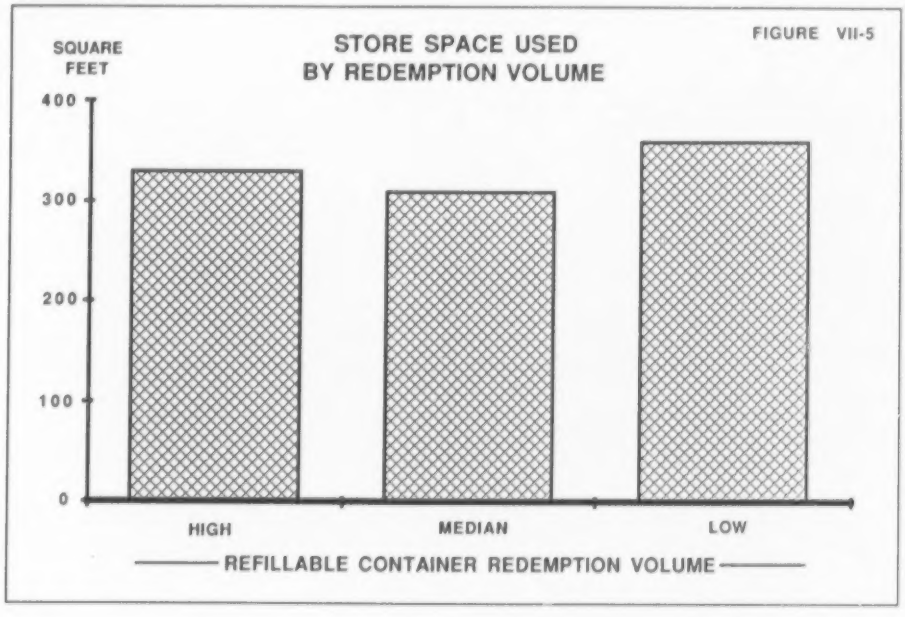


The effect of store redemption volume on costs is evident in Figure VII-4, which shows labor costs ranging from about $.024 to $.085 per container for high and low volume stores, respectively.



SPACE REQUIREMENTS

Figure VII-5 shows the relationship between store redemption volume and reported space use. As with the stores in deposit areas, there is no correlation between reported space used and store volume.



Unlike the stores in mandatory deposit areas, however, stores with refillables tend to use an inordinate amount of space. Some of the causes for this discrepancy are:

- Space management deficiencies are common (probably the major cause).
- A fixed amount of space is required by container type, regardless of volume.
- Distributors pick up containers more frequently for large volume stores; therefore, low volume stores maintain a higher average inventory.

The average reported occupancy cost was $13.45 per square foot, with actual costs ranging from $5.65 to $54.25 per square foot.

INVESTMENT AND OPERATING COSTS

Investment costs are those one-time costs incurred to set up the redemption systems. The majority of these costs are incurred in the purchase of cash registers, racks, shelving, and transporting devices.

Operating costs are those recurrent annual costs attributable to the redemption operation. Most of the reported operating costs are in additional pest extermination, register maintenance, plastic bags, and container carrying devices.

Investment and operating costs for refillable only stores are lower on average than for deposit area stores. These costs amount to about nine percent of the total handling costs for high volume stores, and less than one percent for the low volume stores.

	Costs per Container		
	High Volume	Median Volume	Low Volume
Investment Costs	$.002	—	—
Operating Costs	.001	.001	.001
Total	$.003	$.001	$.001

REDEMPTION METHODS

Three primary redemption methods are reported by the respondents:

- Redemption at the checkout stations.
- Redemption at the customer service center.
- Redemption at a separate, dedicated redemption station.

In addition, a limited number of stores report using reverse vending machines. It is assumed that they are used as a community service.

Figure VII-6 shows that approximately 31 percent of all refillable only stores use checkout stations as their primary redemption method, compared to 13 percent of stores in deposit areas. About 37 percent of all containers are redeemed at the checkout, compared to 8 percent for deposit area stores. About 65 percent of refillable only stores use customer service or a separate redemption center, compared to 78 percent for deposit area stores.

FIGURE VII-6

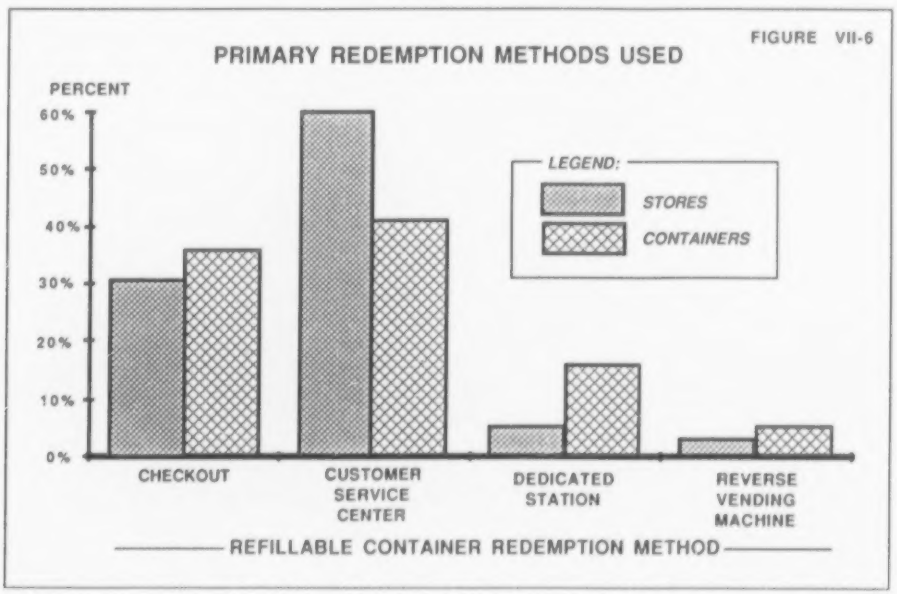
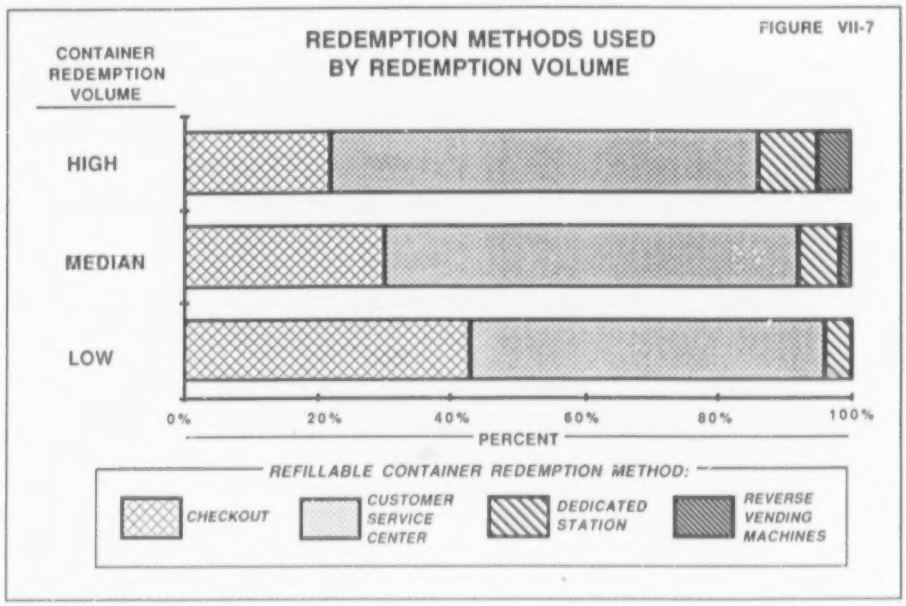


Figure VII-7 shows the relationship between redemption method and store volume. About 42 percent of the stores with low redemption volume tend to use checkout redemption, compared to 21 percent of the high volume stores. About 72 percent of the high volume stores use either customer service or a dedicated center, compared to 53 percent for the low volume stores.



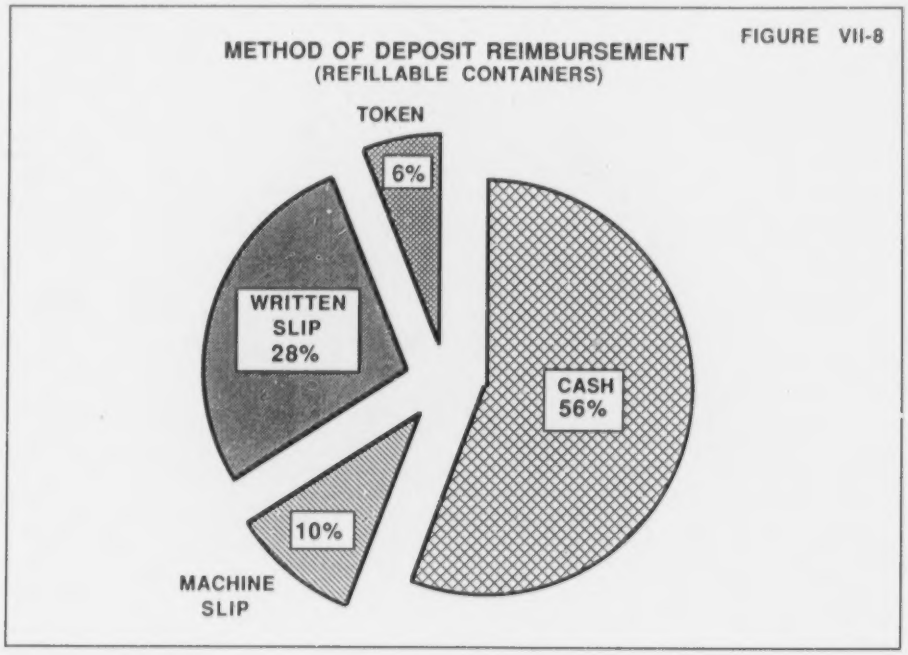
CUSTOMER SERVICE

Respondents indicate three primary methods of payment for redeemed containers:

- ❑ Cash payment at time of redemption.
- ❑ Machine slip countersigned by the redemption clerk.
- ❑ Written slip.

Figure VII-8 shows that 56 percent of the stores use the cash payment method. More stores use written slips than machine slips—a result contrary to the finding in deposit areas.

FIGURE VII-8



Other redemption practice results are:

Practice	Percent of Stores
Keep redemption areas open at all times the store is open	82%
Double sort containers by supplier or glass color	68
Require customers to place containers on counter area	45
Require customers to place containers in designated bins	18
Require customers to sort glass by color, size, or brand	12

VIII COST MODELS FOR REDEMPTION

This section presents four cost models to describe typical redemption methods used by both types of supermarkets surveyed. Exhibit VIII-1 describes the major activities and assumptions used for the store models.

Exhibit VIII-2 shows the costs for a median volume store (average redemption of 30,000 containers per week), redeeming all containers at a redemption center manned on demand or using a combination customer service/redemption center area.

- This model represents a low-cost conventional redemption operation.
  - Both the relatively high weekly container volume and high average redemption per customer help to absorb fixed costs.
  - Containers are sorted once, at time of redemption.
  - Cash payment at the redemption point eliminates an added checkout transaction.

Exhibits VIII-3 and VIII-4 typify the costs expected when containers are redeemed at a redemption center or checkout lanes, respectively, but sorted at the back room.

- For all types of containers, double back room sorting will result in 20 to 30 percent higher costs than full sorting at the time of redemption.
- Stores using only back room sorting and checkout redemption show a 3 percent higher labor cost than similar stores using redemption centers.
  - However, disruption costs, which are not included in the cost models, will magnify the cost difference for checkout redemption.

Exhibit VIII-5 describes the redemption costs for glass in nested cases for a median volume, refillable only supermarket using checkout lane or redemption center.

Under the best of conditions, refillable only stores will incur about 19 percent higher costs than deposit area stores.

EXHIBIT VIII-1
DEFINITION OF MAJOR ACTIVITIES AND COSTS

ACTIVITIES

Walk to Area, Assist and Pay Customer:

- Time to walk from established work area to redemption area, every four customers on average, based on:
  - 50 feet each way for dedicated redemption area.
  - 10 feet each way for combination customer service area and redemption area.
- Redemption clerk removes on average 20 percent of the containers from the customer's bag.
- Time to ring, make change, and pay customer in cash.

Sort at Redemption Area:

- Time to count and place containers in ship carton, plastic bag, or case.

Make Up Bag or Case for Containers:

- Time to insert plastic in bag-in-box, or time to position glass case in work stand.
- Time to remove, close, and tag bags or cases for final shipment.

Transport Containers to Back Room:

- Time to carry empty containers to back room by hand, in shopping cart, or in bulk carriers, based on:
  - 200 feet each way walk distance.
  - 480 cans per trip for aluminum cans; 600 cans per trip in bulk carriers.
  - 180 glass containers in plastic bags; 400 containers in bulk carriers.
  - 100 glass containers in cases; 288 containers in bulk carriers.
  - 120 plastic containers in plastic bags; 150 containers in bulk carriers.

Load Truck (Assumes supplier performs the actual loading of outbound trucks):

- Time to check outgoing empty container load as follows:
  - 15 minutes and 6,400 containers per load for stores in mandatory deposit areas.
  - 8 minutes and 2,600 containers per load for stores outside mandatory deposit areas.

COSTS

Space Costs:

- Includes total occupancy costs of $14.50 per square foot per year.

Management and Clerical Costs:

- $60 per week for stores in mandatory deposit areas.
- $30 per week for stores outside mandatory deposit areas.

Janitorial Costs:

- Incremental front end and back room janitorial labor incurred due to bottle return.

Investment Costs:

- Amortization of capital costs required for bottle redemption activities.

Operating Costs:

- Excess pest control costs.
- Bags, boxes, and supplies.
- Cash register maintenance.
- Shelf and back room inventory deposit carrying costs.

Breakage and Pilferage Losses:

- Based on the deposit value plus the supermarket's labor and expenses, assuming an average deposit of $.07 per container and the following percentage losses:

Aluminum cans and plastic	- 1.0%
Glass containers	- 1.5%

EXHIBIT VIII-2

ALL SORTING AT FRONT END: DEDICATED OR CUSTOMER SERVICE FRONT END REDEMPTION

For Median Volume Store (30,000 Containers/Week) In Deposit Law Areas

	Aluminum Cans	Bulk Glass	Nested Glass	Plastic
Activity (In Seconds)				
Walk to area, assist and pay customer	.726	.726	.726	.726
Sort at redemption area	1.870	2.101	2.730	2.290
Make up bag or case for containers	.173	.592	.832	.259
Transport containers to back room	.208	.714	1.00	.833
Load truck	.141	.141	.141	.141
Total Direct Labor Time	3.118	4.274	5.429	4.249
Costs				
Direct labor cost (at $11.50/hour)	$.010	$.014	$.017	$.014
Management and clerical cost	.002	.002	.002	.002
Janitorial cost	.002	.002	.002	.002
Space cost*	.004	.004	.004	.006
Investment cost	.002	.002	.002	.002
Operating costs	.001	.001	.001	.001
Breakage and pilferage losses	.001	.001	.001	.001
Total Costs	$.022	$.026	$.029	$.028

* 400 square feet x $14.25/square feet.

EXHIBIT VIII-3

NO SORTING AT FRONT END: DEDICATED OR CUSTOMER SERVICE FRONT END REDEMPTION

For Median Volume Store (30,000 Containers/Week) In Deposit Law Areas

	Aluminum Cans	Bulk Glass	Nested Glass	Plastic
Activity (In Seconds)				
Walk to area, assist and pay customer	.726	.726	.726	.726
Place containers in bulk transport carrier	1.32	1.49	1.49	1.69
Make up bag or case	.173	.592	.832	.259
Transport containers to backroom (bulk carrier)	.166	.252	.252	.676
Sort containers at backroom	2.32	2.64	3.14	2.71
Load truck	.141	.141	.141	.141
Total Direct Labor Time	4.846	5.841	6.581	6.202
Costs				
Direct labor cost (at $11.50/hour)	$.015	$.019	$.021	$.020
Management and clerical cost	.002	.002	.002	.002
Janitorial cost	.002	.002	.002	.002
Space cost*	.004	.004	.004	.006
Investment cost	.002	.002	.002	.002
Operating costs	.001	.001	.001	.001
Breakage and pilferage losses	.001	.001	.002	.002
Total Costs	$.027	$.031	$.034	$.035

* 400 square feet x $14.25/square feet.

EXHIBIT VIII-4

NO SORTING AT FRONT END: CHECKOUT LANES

For Median Volume Store (30,000 Containers/Week) In Deposit Law Areas

	Aluminum Cans	Bulk Glass	Nested Glass	Plastic
Activity (In Seconds)				
Assist and pay customer	.636	.663	.663	.663
Place containers in bulk transport carrier	1.77	2.12	2.12	2.31
Transport containers to backroom (bulk carrier)	166	.252	.252	.676
Make up bag or case	.173	.592	.832	.259
Sort containers at backroom	2.32	2.64	3.14	2.71
Load truck	.141	.141	.141	.141
Total Direct Labor Time	5.206	6.408	6.896	6.759
Costs				
Direct labor cost (at $11.50/hour)	$.017	$.020	$.022	$.022
Management and clerical cost	.002	.002	.002	.002
Janitorial cost	.002	.002	.002	.002
Space cost*	.004	.004	.004	.006
Investment cost	.001	.001	.001	.001
Operating costs	.001	.001	.001	.001
Breakage and pilferage losses	.001	.001	.002	.002
Total Costs	$.028	$.031	$.034	$.036

* 400 square feet x $14.25/square feet.

EXHIBIT VIII-5

50 PERCENT SORTING AT DEDICATED CENTER, NO SORTING AT CHECKOUT: FRONT END REDEMPTION

Median Volume, Returnable Only Store (7,300 Containers/Week)*

NESTED GLASS ONLY

	Checkout Redemption[1]	Dedicated or Customer Service Redemption[2]
Activity (In Seconds)		
Assist and pay customer	.551	.753
Place container in bulk carrier front end	2.530	1.300
Front end sort and place container in case	—	1.400
Make up bag or set up empty case	.592	.832
Backroom sort and place containers in case	3.140	1.570
Transport containers to backroom	.252	.252
Load truck	.184	.184
Total Direct Labor Time	7.249	6.296
Costs		
Direct labor cost (at $11.50/hour)	$.023	$.020
Management and clerical cost	.004	.004
Janitorial cost	.002	.002
Space cost	.004	.004
Investment cost	.001	.001
Operating costs	.001	.001
Breakage and pilferage losses	.002	.002
Total Costs	$.037	$.034

* Twelve Containers/Customer Average Return.

[1] All sorting done at backroom.

[2] 50 percent of sorting done at dedicated center/customer service; 50 percent sorted at backroom.

Exhibit VIII-6 shows the costs of 16 ounce, 8-pack refillables for a median volume store.

- For the optimal case, where all 16 ounce containers are returned sorted in the 8-pack unit, handling costs are estimated at $.023 per container.
- For a store handling 60 percent 16 ounce, 8-pack and 40 percent loose bottles, the average cost per container is estimated at $.028 per container.

EXHIBIT VIII-6

UNITIZED PACK: NO SORTING AT REDEMPTION: 8/16 OUNCE PACK

Median Volume Refillable Only Store (7,300 Containers/Week)*

	100 Percent Returned Sorted in 8 Pack	60 Percent Returned Sorted In 8 Pack 40 Percent Returned Loose Bottles
Activity (In Seconds)		
Assist and pay customer	.551	.551
Place 8 pack in empty case	.375	.225
Place loose containers in bulk carrier	—	1.300
Remove full case of returnables and position empty case in rack	1.75	1.05
Backroom sort and place containers in case	—	1.256
Transport containers to backroom	.252	.252
Load truck	.184	.184
Total Direct Labor Time	3.112	4.818
Costs		
Direct labor cost (at $11.50/hour)	$.010	$.015
Management and clerical cost	.004	.004
Janitorial cost	.002	.002
Space cost	.004	.004
Investment cost	.001	.001
Operating costs	.001	.001
Breakage and pilferage losses	.001	.001
Total Cost Per Container	$.023	$.028

* 12 containers/customer average return.

APPENDIX

WORKSHEET METHODOLOGY AND NOTATIONS CONTAINER HANDLING COSTS

METHODOLOGY

Eight worksheets (labeled A through H) have been developed to guide the analyst through the development of container handling costs.

Worksheets A through G are used to gather the required information for a specific store cost segment, and to calculate a component cost of the total handling costs.

Worksheet H is used to arrange the data and summarize the results from Worksheets A through G to arrive at a final result.

NOTATIONS

The worksheets use three different sets of notations:

Example 1:
A1_____ Throughout the worksheet, variable A1 will represent the value entered in the blank to the right.

Example 2:
A2_____ Prompts the analyst to enter the value of A1 in the blank above. The value is now represented by A2.
A1

Example 3:
A3_____ (1.53) A value immediately to the right of the blank space represents a norm developed by Cresap, McCormick and Paget. The analyst can either enter his own value or use the value as shown.

The variables have been kept in alphabetical order for ease of use. Thus, a variable such as C5 would be found in Worksheet C.

A PC computer diskette incorporating the worksheets is available.

A1

WORKSHEET A:
FIXED REDEMPTION TIME

This worksheet is used to estimate the fixed redemption per customer for redemption centers.

1.	Enter distance walked by Redemption Clerk from normal work area to redemption area.....	A1	_____feet
2.	Estimate frequency of clerk's walks to redemption area in terms of number of customers served before walk is required.....	A2	_____customers (4)
2.a.	Walk time per customer = $\frac{\text{_____}}{\text{A1}}$ x .25 x 2 + $\frac{\text{_____}}{\text{A2}}$ =	A3	_____seconds/customer
3.	Enter time to ring up and make change (do not include sorting) as per your store redemption method:		
3.a.	Cash payment.....	A4	_____seconds (8.9)
3.b.	Signed machine slip.....	A5	_____seconds (12.24)
3.c.	Written slip.....	A6	_____seconds (17.21)
3.d.	Ring time (select (A4), (A5) or (A6)).....	A7	_____seconds
4.	If customer is paid with cash at redemption area, enter 0 seconds		
	Otherwise, enter time to cash slip at checkout....	A8	_____seconds (0, or 2.35)
5.	Total fixed time per customer = $\frac{\text{_____}}{\text{A3}}$ + $\frac{\text{_____}}{\text{A7}}$ + $\frac{\text{_____}}{\text{A8}}$ =	A9	_____seconds

B1

WORKSHEET B:
FRONT END AND SORTING LABOR

This worksheet is used to estimate front end labor for redemption and sorting and for moving containers to the back room.

1. Enter seconds/container to remove containers from customer bag and place on Redemption Desk..... B1 _____seconds/container (.62)

2. Enter percent of containers that are retrieved by store personnel (rather than client)..... B2 _____% by store personnel

2.a. Weighed time to remove containers = _____ x _____% = B3 _____seconds/container
B1 / B2

3. Calculate the percent of containers sorted at the front end, at the back room, and picked up by third party or shipped unsorted.

	Percent Sorted At Front End	Percent Sorted At Back Room	Percent Picked Up By Third Party(a)	Percent Reverse Vending	Total(b)
Aluminum cans	B4 _____	B5 _____	B6 _____	B7 _____	100%
Bulk glass	B8 _____	B9 _____	B10_____	B11_____	100%
Nested glass	B12_____	B13_____	B14_____	B15_____	100%
Plastic	B16_____	B17_____	B18_____	B19_____	100%

4. Calculate Front End Sorting Time.....

	(A) Percent Sorted At Front End	(B) Seconds To Sort Per Container		(A)x(B) Weighted Seconds
Aluminum Cans	_____% (B7)	B20_____	(1.87)	B21 _____
Bulk Glass	_____% (B8)	B22_____	(2.01)	B23 _____
Nested Glass	_____% (B12)	B24_____	(2.73)	B25 _____
Plastic	_____% (B16)	B26_____	(2.29)	B27 _____

(a)Partially sorted at redemption center.
(b)Must add up to 100 percent.

WORKSHEET B:
FRONT END AND SORTING LABOR (Cont'd)

5. Calculate Back Room Sorting Time.....

	(A) Percent Sorted At Back Room	(B) Seconds To Sort Per Container		(A)x(B) Weighted Seconds
Aluminum Cans	_____% B5	B28_____	(2.32) B29	_____
Bulk Glass	_____% B9	B30_____	(2.64) B31	_____
Nested Glass	_____% B13	B32_____	(3.14) B33	_____
Plastic	_____% B17	B34_____	(2.71) B35	_____

6. Enter time in seconds to prepare/close and tag plastic bags or glass cases for outbound shipment (whether done at front end or back room).....

	(A) Seconds To Prepare		(B) Containers Per Bag Or Case		(A)*(B) Seconds Per Containers
Aluminum Cans	B36_____	(41.47)	B37_____	(240) B38	_____
Bulk Glass	B39_____	(30.35)	B40_____	(70) B41	_____
Nested Glass	B42_____	(39.96)	B43_____	(24) B44	_____
Plastic	B45_____	(41.47)	B46_____	(160) B47	_____

7. Transport containers to back room:

7.a. Enter feet from redemption area to back room storage..... B48 _____feet

7.b. _____ x .30 seconds/feet x 2 =..... B49 _____seconds/trip
B48

B3

WORKSHEET B:
FRONT END AND SORTING LABOR (Cont'd)

7.c. Enter number of containers moved per trip and calculate the move time per container

	(A) Number Of Containers Per Trip		(B) Trip Time		(B)÷(A) Travel Time Per Container	
Aluminum Cans	B50 _____	(480)	_____ / B49		B51 _____	seconds/container
Bulk Glass	B52 _____	(140)	_____ / B49		B53 _____	seconds/container
Nested Glass	B54 _____	(100)	_____ / B49		B55 _____	seconds/container
Plastic	B56 _____	(120)	_____ / B49		B57 _____	seconds/container

8. Front end time to partially sort or drop containers in bins.....

	Per Cent Picked Up By Third Party		Partial Sort Time			
Aluminum Cans	_____ / B6	x	B58 _____	(.38) =	B59 _____	seconds/container
Bulk Glass	_____ / B10	x	B60 _____	(.56) =	B61 _____	seconds/container
Nested Glass	_____ / B14	x	B62 _____	(.56) =	B63 _____	seconds/container
Plastic	_____ / B18	x	B64 _____	(.53) =	B65 _____	seconds/container

9. Total front end time per container .....

Aluminum Cans	+ _____ / B3	+ _____ / B21	+ _____ / B38	+ _____ / B51	+ _____ / B59	= B66 _____	seconds/container
Bulk Glass	+ _____ / B3	+ _____ / B23	+ _____ / B41	+ _____ / B53	+ _____ / B61	= B67 _____	seconds/container
Nested Glass	+ _____ / B3	+ _____ / B25	+ _____ / B44	+ _____ / B55	+ _____ / B63	= B68 _____	seconds/container
Plastic	+ _____ / B3	+ _____ / B27	+ _____ / B47	+ _____ / B57	+ _____ / B65	= B69 _____	seconds/container

C1

WORKSHEET C:
BACK ROOM LABOR AND LOADING

The worksheet is used to estimate the back room labor and loading of containers for shipment.

1. Enter minutes for checking and loading outbound shipment..... C1 _____minutes

1.a. Enter average number of containers shipped per load C2 _____containers

1.b. Average seconds to prepare shipment load =
$\frac{\text{_____}}{\text{C1}} \times 60 \text{ seconds} \div \frac{\text{_____}}{\text{C2}} =$ C3 _____seconds/container

2. Total back room seconds per container

Aluminum Cans $\frac{\text{_____}}{\text{B29}} \div \frac{\text{_____}}{\text{C3}} =$ C4 _____seconds/container

Bulk Glass $\frac{\text{_____}}{\text{B31}} \div \frac{\text{_____}}{\text{C3}} =$ C5 _____seconds/container

Nested Glass $\frac{\text{_____}}{\text{B33}} \div \frac{\text{_____}}{\text{C3}} =$ C6 _____seconds/container

Plastic $\frac{\text{_____}}{\text{B35}} \div \frac{\text{_____}}{\text{C3}} =$ C7 _____seconds/container

D1

WORKSHEET D:
SPACE COST CALCULATION

This worksheet is used to determine the store occupancy costs and space cost for containers.

1. Fill in the table below if you need to compute your store annual cost per square foot. Otherwise enter the amount in Entry D3.....

Expense	Annual Cost
Rent	$_____
Utilities	$_____
Maintenance	$_____
Property Tax	$_____
Insurance	$_____
Others	$_____

2. Total annual costs per store ..... D1 $_____

3. Enter total store area ..... D2 _____square feet

4. Calculate store costs per square foot
$_____ (D1) ÷ _____ (D2) =..... D3 $_____per square foot/year

5. Calculate the space used for redemption activities. (Include both front end and back room space) considering the proportion of time the space is utilized for redemption.

	(A) Square Feet	(B) Percent Utilized For Redemption		(A)x(B)
Dedicated area	D4_____	100%	D5	_____
Multi-use area	D6_____	D7_____	D8	_____

5a. Total area utilized for redemption activity..... D9 _____

6. Redemption space cost D3 $_____
x D9_____ ÷ 52 weeks ..... D10 $_____per/week

WORKSHEET D:
SPACE COST CALCULATION (Cont'd)

7. Estimate the average percent space used by container type and space cost by container type.

	(A) Percent Of Redemption Space Utilized	(B) Total Space Cost	(A)x(B)
Aluminum cans	D11_____	$_____ / D10	D12 $_____
Bulk glass	D13_____	$_____ / D10	D14 $_____
Nested glass	D15_____	$_____ / D10	D16 $_____
Plastic	D17_____	$_____ / D10	D18 $_____
Total	_____ / 100%		

E1

WORKSHEET E:

CARRYING COST OF DEPOSIT INVENTORY CALCULATION

The worksheet will yield an approximation of the carrying costs of containers and is based on one week average deposit carrying costs.

1. Enter your corporate annual interest rate..... E1 _____%

1.a. Weekly Interest rate = _____% ÷ 52 = ... E2 _____% per week
E1

2. Enter the average case deposit per container, the average container deposit, and the average container inventory carried.....

	Aluminum Cans	Bulk Glass	Nested Glass	Plastic
3. Case deposit per container(a)	E3 $____	E9 $____	E15 $____	E20 $____
4. Deposit per container	E4 $____	E10 $____	E16 $____	E21 $____
5. Total deposit per container (Line 3 + Line 4)	E5 $____	E11 $____	E16 $____	E22 $____
6. Container inventory (empty + full)(b)	E6 ____	E12 ____	E17 ____	E23 ____
7. Average investment (Line 5 x Line 6)	E7 $____	E13 $____	E18 $____	E24 $____
8. Carrying cost per week (Line 7 x E2)(c)	E8 $____	E14 $____	E19 $____	E25 $____

(a)Average case deposit divided by number of containers.
(b)Average number of empty plus full containers on shelf and back room.
(c)Interest rate x average investment.

F1

WORKSHEET F:
CONTAINER INVESTMENT AND OPERATING COST

This worksheet is used to estimate the investment and operating costs of containers.

1. Complete the table below to calculate the annualized investment cost for returnable handling facilities.....

		(A) Investment Cost		(B) Depreciation Years		(A)*(B) Annualized Cost
Building alterations or additions	F1	$_____	F2	_____	F3	$_____
Computers or registers	F4	$_____	F5	_____	F6	$_____
Racks and shelving	F7	$_____	F8	_____	F9	$_____
Transportation containers	F10	$_____	F11	_____	F12	$_____
Others	F13	$_____	F14	_____	F15	$_____

2. Total annualized investment..... F16 $_____

3. Complete the table below to calculate the operating costs of the redemption operation.....

		Annual Operating Cost
Computer or register maintenance	F17	_____
Additional pest extermination	F18	_____
Plastic bags, containers, etc.	F19	_____
Others	F20	_____

4. Total annual operating cost..... F21 _____

G1

WORKSHEET G:
GENERAL STORE AND WAGE INFORMATION

This worksheet is used to develop wage and container volume information.

1. Front end average labor cost calculation.....

1a. Enter the labor rate (including benefits) and percent of time spent by each function....

Function		(A) Hourly Rate	(B) Percent Time Spent		(A)x(B)
Full-time cashiers	G1	$_____	G2 _____%	G3	$_____
Part-time cashiers	G4	$_____	G5 _____%	G6	$_____
Baggers	G7	$_____	G8 _____%	G9	$_____
Stock clerks	G10	$_____	G11_____%	G12	$_____
Janitors	G13	$_____	G14_____%	G15	$_____
Others	G16	$_____	G17_____%	G18	$_____
			100%	G19	$_____ Average front end rate

1.b. _____ ÷ 3600 = G20 $_____ Front end labor per second.
G19

2. Back room average labor cost calculation.....

2a. Enter the labor rate (including benefits) and what percent of time spent by each function.....

Function		(A) Hourly Rate	(B) Percent Time Spent		(A)x(B)
Stock clerks	G21	$_____	G22_____%	G23	$_____
Baggers	G24	$_____	G25_____%	G26	$_____
Janitors	G27	$_____	G28_____%	G29	$_____
Others	G30	$_____	G31_____%	G32	$_____
			100%	G33	$_____ Average back room rate

2.b. _____ ÷ 3600 = G34 _____ Back room rate per second.
G33

Note: Row (B) must add up to 100 percent.

WORKSHEET G:
GENERAL STORE AND WAGE INFORMATION (Cont'd)

3. Calculation of management and clerical labor involved in redemption operations.

Function		(A) Estimated Hourly Cost		(B) Weekly Hours		(A)x(B) Weekly Cost
Store manager	G35	$_____	G36	_____	hours G37	$_____
Assist. managers	G38	$_____	G39	_____	hours G40	$_____
Clerical	G41	$_____	G42	_____	hours G43	$_____
Others	G44	$_____	G45	_____	hours G46	$_____

3a. Total management weekly cost ..... G47 $_____

4. Enter the estimated weekly redemption volume for the store.....

Container Type	Weekly Redemption Units(a)	
Aluminum cans	G48_____	containers per week
Bulk glass	G49_____	containers per week
Nested glass	G50_____	containers per week
Plastic	G51_____	containers per week

4.a. Total redemption volume G52_____ containers per week

5. Enter the average number of containers returned by customer..... G53 _____containers per customer (28)

(a)A unit is an individual container.

H1

WORKSHEET H:
COST CALCULATIONS

1. Fixed time per container _____ ÷ _____ .. H1 _____ seconds/customer
   (A9) (G53)

1.a. Fixed costs per container = _____ x _____ H2 $_____ per container
   (H1) (G20)

2. Investment cost per container =
   $_____ ÷ _____ ÷ 52 ..... H3 $_____ per container
   (F16) (G52)

3. Operating cost per container =
   $_____ ÷ _____ ÷ 52 ..... H4 $_____ per container
   (F21) (G52)

4. Management cost per container =
   $_____ ÷ _____ ..... H5 $_____ per container
   (G47) (G52)

5. Space costs per container

	(A) Space Cost	(B) Weekly Volume		(A)÷(B)
Aluminum cans	$_____ (D12)	_____ (G48)	H6	$_____ per container
Bulk glass	$_____ (D14)	_____ (G49)	H7	$_____ per container
Nested glass	$_____ (D16)	_____ (G50)	H8	$_____ per container
Plastic	$_____ (D18)	_____ (G51)	H9	$_____ per container

6. Front end labor costs.....

	Front End Seconds/ Container		Labor Cost Per Second		Cost Per Container
Aluminum cans	_____ (B66)	x	_____ (G20)	= H10	$_____ per container
Bulk glass	_____ (B67)	x	_____ (G20)	= H11	$_____ per container
Nested glass	_____ (B68)	x	_____ (G20)	= H12	$_____ per container
Plastic	_____ (B69)	x	_____ (G20)	= H13	$_____ per container

WORKSHEET H:
COST CALCULATIONS (Cont'd)

7. Backroom labor costs.....

	Back Room Seconds/ Container		Labor Cost Per Hour			
Aluminum cans	_____ C4	x	$_____ G34	=	H14 $_____	per container
Bulk glass	_____ C5	x	$_____ G34	=	H15 $_____	per container
Nested glass	_____ C6	x	$_____ G34	=	H16 $_____	per container
Plastic	_____ C7	x	$_____ G34	=	H17 $_____	per container

8. Cost of Third Party Services.....

8.a. Calculate the weighted cost per container of Third Party Services.....

	(A) Percent Of Containers Third Party	(B) Third Party Fees Per Container	(A)x(B) Weighted Cost Per Container
Aluminum cans	_____ B6	H18 $_____	H19 $_____
Bulk glass	_____ B10	H20 $_____	H21 $_____
Nested glass	_____ B14	H22 $_____	H23 $_____
Plastic	_____ B18	H24 $_____	H25 $_____

8b. Calculate the weighted cost per container of reverse vending.

	(A) Percent Reverse Vending	(B) Weekly Redemption Volume	(C=AxB) Reverse Vending Volume	(D) Weekly Machine Fixed Charges	(E=D÷C) Fixed Charges Per Container	(F) Variable Fee Per Container	(G=E+F) Reverse Vending Total Fee
Aluminum cans	____% B7	_____	H26 _____	H27 $_____	H28 $_____	H29 $_____	H30 $_____
Bulk glass	____% B11	_____	H31 _____	H32 $_____	H33 $_____	H34 $_____	H35 $_____
Nested glass	____% B15	_____	H36 _____	H37 $_____	H38 $_____	H39 $_____	H40 $_____
Plastic	____% B19	_____	H41 _____	H42 $_____	H43 $_____	H44 $_____	H45 $_____

H3

WORKSHEET H:
COST CALCULATIONS (Cont'd)

9. Calculate inventory carrying cost per container.

Aluminum cans	$____ (E8) ÷ ____ (G48) =	H46	$_____	per container
Bulk glass	$____ (E14) ÷ ____ (G49) =	H47	$_____	per container
Nested glass	$____ (E19) ÷ ____ (G50) =	H48	$_____	per container
Plastic	$____ (E25) ÷ ____ (G51) =	H49	$_____	per container

10. Calculate breakage and pilferage cost per container.....

	(A) Average Deposit Cost	(B) Labor And Expense Cost		(C=A+B) Total Loss Per Container	(D) Estimated Per Cent Loss	(CxD) Loss Per Container
Aluminum cans	$____ H50	$____ H51	(.015)	$____ H52	____ % H53	$____ H54
Bulk glass	$____ H55	$____ H56	(.017)	$____ H57	____ % H58	$____ H59
Nested glass	$____ H60	$____ H61	(.017)	$____ H62	____ % H63	$____ H64
Plastic	$____ H65	$____ H66	(.018)	$____ H67	____ % H68	$____ H69

WORKSHEET H:
COST CALCULATIONS (Cont'd)

11. Total store costs per container.....

	Aluminum Cans	Bulk Glass	Nested Glass	Plastic
Fixed costs	$____ H2	$____ H2	$____ H2	$____ H2
Investment costs	$____ H3	$____ H3	$____ H3	$____ H3
Operating costs	$____ H4	$____ H4	$____ H4	$____ H4
Management costs	$____ H5	$____ H5	$____ H5	$____ H5
Space costs	$____ H6	$____ H7	$____ H8	$____ H9
Carrying costs	$____ H46	$____ H47	$____ E48	$____ E49
Front end labor costs	$____ H10	$____ H11	$____ H12	$____ H13
Backroom labor costs	$____ H14	$____ H15	$____ H16	$____ H17
Third party fees	$____ H19	$____ H21	$____ H23	$____ H25
Breakage and pilferage	$____ H54	$____ H59	$____ H64	$____ H69
Total cost per container =	$_____	$_____	$_____	$_____
Handling fee or salvage revenue	$_____	$_____	$_____	$_____
Net cost	$_____	$_____	$_____	$_____

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